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AGRICULTURE IN INDIAN ECONOMIC PLANNING

by

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A THESIS
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The undersigned certify that they have read and recommend to the Faculty of Graduate Studies for acceptance, a thesis entitled "Agriculture in Indian Economic Planning," submitted by Tadiboyina Venkateswarlu, in partial fulfillment of the requirements for the degree of Master of Science.

ABSTRACT

The Government of India has attempted to bring about a revolution in the rural sector through the transformation of traditional agriculture. It inaugurated a planned approach for increasing agricultural production through the inception of the Five Year Plans beginning in 1950-51. Increases in agricultural production have not met the expectations of the country because of inadequate provision of inputs by the government. The result has been food shortages, inflation, and foreign exchange difficulties.

A review of agriculture in Indian economic planning provided the framework for analyzing the performance of Indian agriculture. A review of the literature suggested the means and incentives the government had to provide for revolutionizing the farm sector. It also suggested the need for a balance between agriculture and industry. A review of literature on Indian agriculture suggested some important reasons for the slow rate of agricultural growth in the economic plans.

It was concluded that the slow performance of Indian agriculture was due to inadequate provision of and ineffective implementation of agricultural programmes. An analysis of crop production showed that nearly half the agricultural production of the last decade was due to new area brought under cultivation. It was concluded that farmers were responsive to scientific methods of cultivation. Agricultural production provided the evidence that small farms would give more yield than large farms.

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CHAPTER I

THE PROBLEM OF MODERN AGRICULTURAL DEVELOPMENT

The Government of India has been striving since 1950-51 to transform farming by modernizing agricultural practices and raising the yield per acre. The performance of agriculture was not commensurate with the expectations of the last fifteen years of planning in spite of the efforts made by the government. The slow rate of growth of Indian agriculture has led to a lot of controversy amongst the public. Questions have been raised over the slow performance of Indian agriculture in the following sectors: (1) inefficiency of the government in the formulation and the implementation of various agricultural programmes; (2) lack of responsiveness on the part of the farmers to scientific methods of cultivation; and (3) the uneconomic size of holdings of the farmers. So far, no attempt has been made to provide empirical evidence for the causes which impeded agricultural development.

Purpose of the study

The purpose of the study was to analyse the reasons that impeded the rate of growth of agricultural productivity during the last fifteen years of agricultural planning. There has been a tendency towards increasing the outlay allotted to agricultural production in each of the three Five Year Plans. Increased emphasis has been placed on the provision of irrigation facilities, credit, fertilizers,

insecticides, and improved seeds. In spite of these efforts, India has not registered expected grain production. The analysis in the thesis is organized around such factors as:

(1) The balance between agriculture and industry in Indian economic planning;

(2) The provision of inputs such as fertilizers, seeds, pesticides, irrigation, and credit, and the extent of their implementation to the targeted levels;

(3) The amount of agricultural production accruing because of extensive cultivation;

(4) Area planning and its suitability to different crops;

(5) The relation between the expected grain production and outlay allotted in the last fifteen years;

(6) Farmers' response to technological change and improved methods of cultivation;

(7) Size of holdings and their relation to productivity.

Objectives

The major objective was to find out the reasons contributing to the slow rate of growth of Indian agriculture. The second objective was a prerequisite to the first.

A close look at the literature on economic development of underdeveloped countries showed that farmers were illiterate, superstitious and antipathetic to development.

As India was a developing country, the objective was to investigate these problems of non-responsiveness. It was also proposed to find out whether the targets set by the government had realistic bases. This problem further enlarges if one were to go a step beyond and ask whether or not the overall plan itself is balanced enough to cater to the needs of the farmers and the needs of the growing agricultural sector as a whole; similarly the problem of whether area planning and crop distribution are based on the resources of the region and its suitability to various crops. The objective here is to provide the evidence for these causes. In an economy like that of India, the importance of the Co-operative Credit Supply has been long since realized on all sides. The objective was to show how far the needs of the farmers have been met by credit supply.

One of the problems of Indian agriculture has been the size of the land holdings of the farmers and its impact on agricultural output and income per holding. Net returns tend to increase with the size of the farm, but it is questionable whether large sized farms yield more per acre than small farms under given conditions of technology. In view of the problem of low productivity of food grains in India and given a low level of technology, the objective of this study was to provide a comprehensive analysis of the size of holdings and its relation to per acre yield.

Hypothesis

The following hypothesis emerged from the objectives outlined above:

The failure of agriculture was due to inadequate planning and the lack of provision of necessary inputs, rather than the lack of response on the part of the farmers and the small size of farms.

Sources of data

The primary data were collected by the author in the village of Andhra Pradesh, South India, by means of personal interviews. The secondary data were provided by the Ministry of Food and Agriculture, Directorate of Economics and Statistics, Government of India, Farm Management Centres of Uttar Pradesh, West Bengal and Panjab, the Planning Commission, Programme Evaluation Organization, and the United Nations Organization.

Method of analysis

An attempt was made to find out how far the industries started under the economic plans were oriented to agricultural development in the sense of producing necessary requirements for increasing agricultural production. The analysis of credit was made by taking into account the question of whether or not the co-operative societies were able to provide enough loans to farmers of all categories in Madras State. It was also attempted to see whether irrigation projects were able to provide timely help to farmers in Kerala State.

The analysis of crop production was made at two levels - at one level the analysis was oriented to the expenditures on agricultural production in the plans and their rationality to the expected amounts. The gap between the achievements and targets was analysed in the light of the above analysis. At the second level, an attempt was made to determine whether the increase in overall production was due to extensive or intensive cultivation. An attempt also was made to find out whether due consideration was given to differences in areas and their suitability to particular crops.

Technology in Indian agriculture was examined on the basis of primary data collected by interviews with farmers. Agricultural productivity was analyzed in relation to the size of holdings and the application of various inputs, including human labor, bullock labor, fertilizers, and output. Special attention was paid to the yield per acre as a measure of farm productivity.

CHAPTER II

AGRICULTURE IN INDIAN ECONOMIC PLANNING

Indian economic planning

India attained independence in 1947, and started on the road to planned development of agricultural production in 1951 through the inception of the Five Year Plan. Since then various measures have been taken with a view to transforming the stagnant agriculture and moulding the entire sphere of economic, social, psychological, and cultural outlook of rural India. The measures were designed to bring India up to date, to participate in the stream of modern life with all of its amenities and promises of future rewards. For an overall development of India, it was neither agriculture at the cost of industry, nor industry at the cost of agriculture which was sought to be developed. It was to be thought of as a series of interchanges between agriculture and industry with rising intensity - industry supplying the basic needs of material inputs for agriculture, agriculture feeding back its surpluses for the development of industry, and industry supplying the various consumer goods on which agricultural surpluses could be spent. This kind of interrelationship as a precondition for economic development of India was not realized by the government and planners.

In the sphere of agricultural production, India's planners have been attempting since 1951 to diversify the

rural economy by intensifying and modernizing farming practices and raising the yield per acre. The Planning Commission, the Ministry of Agriculture and the Ministry of Community Development and Cooperation have evolved a fairly detailed scheme for agricultural production under the plans, so that this important problem of increasing agricultural production could be tackled in a thorough and well coordinated manner. Indian economic policy, as it has been taking shape in the years since Independence, had as one of its foremost objectives the lessening of the dependence of the population on agriculture and the expansion of employment opportunities in the secondary and tertiary sectors.[1]

The first Five Year Plan was completed in 1955-56, the second Plan in 1960-61 and the third Plan in 1966. The first Plan (1951-52 to 1955-56) was a modest one and concerned more with the objective of industrial production. It, however, laid the basis for planned development by evolving a framework of social and economic policies and by starting the development of irrigation, power, transport, technical education and scientific research. The estimated investment during the first Plan was RS 33,360 million. Low priority was given to agricultural production by

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[1]Planning Commission, Second Five Year Plan, Government of India, 1956, p. 75.

allocating RS 2,400 million.[1]

The second Five Year Plan had framed broad strategy for Indian development. It emphasized the development of heavy industries like steel, machine building, fuel and power, with a view to laying the foundations for industrial development. Of the total estimated investment of RS 67,500 million, about 5 percent was for agricultural development, about 54 percent was for heavy industry development, including power, steel and machine building, and about 19 percent was for the development of social services. The rest comprised investment in inventories (about 15 percent) and village and small scale industries (about 4 percent).[2]

In the third Five Year Plan, the investment pattern was more or less similar to that of the second Five Year Plan. There was, however, a little emphasis on agriculture (20 percent) at the cost of social services (16 percent). Within the group comprising heavy and basic industries including power, fuel, steel, machine building, and transport (52 percent), there was greater emphasis on fuel, steel, and machine building (35 percent) at the cost of transport (17 percent as against 21 percent during the Second Plan). The total

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[1]Planning Commission, First Five Year Plan, Government of India, 1951, p. 20.

[2]Planning Commission, Second Five Year Plan, Government of India, 1956, p. 220.

investment in the third Five Year Plan was RS 100,400 million, approximately equal to the aggregate investment during the first ten years of planning.[1]

Balance between agriculture and industry

The allocation of outlays to different sectors of the economy in the last ten years indicated that Indian economic development had been planned on the basis of unbalanced growth. It seemed that the government intented to industrialize the economy rapidly without making the necessary modifications for healthy industrial growth. In the first Five Year Plan RS 1,960 million were given to food grain production, excluding animal husbandry, forestry and fisheries. During the second Five Year Plan, high priority was given to industrial development by allotting RS 36,450 and thus underestimated the the extent of agricultural transformation. The result was low agricultural production, inflation, rationing and starvation in the country from 1955-61.

The chapter defining the objectives and priorities in regard to industrial development in the third Five Year Plan stated:

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[1]Planning Commission, Third Five Year Plan, Government of India, 1961, p. 220.

> The industrial plan for the period 1961-66 has to be governed by the overriding need to lay the foundations of rapid industrialization over the next 15 years, if long term objectives in regard to national income and employment are to be achieved. From this point of view, it is essential to press forward with the establishment of basic capital and producers goods industries--with special emphasis on machine building programmes, and also with the acquisition of related skills, technical know-how, and designing capacity so that in the following plan period, the growth of the economy in the field of power, transport, industry, and mineral production will become self-generating and increasingly independent of outside help.[1]

The plan laid emphasis on the manufacture of capital goods and producers' goods in preference to consumer goods. In the Indian context, the largest volume of production, the most important one, was agricultural, and it would have been legitimate to presume that the industrial plan would provide adequately for the manufacture of capital goods and producers' goods required for agriculture. This was not the case in the first two plans (1951 to 1961), and from the chapters on industrial development in the third Five Year Plan, it would seem that the position in the immediate future would not be different. The only provision that was made for the manufacture of producers' goods for agriculture appeared to be an increase in the production of nitrogenous fertilizers of one million tons (in terms of nitrogen by 1966), a quantity which would provide some six pounds of nitrogen to each of the 350 million acres in crops. No provision appeared to have been made for the industrial

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[1]Planning Commission, Third Five Year Plan, Government of India, 1961, p. 70.

production of chemical fertilizers (other than nitrogenous ones), improved machinery and implements, harvesters, or insecticides and fungicides, the use of which could have stepped up food production in the country. It would seem that while the planners would like to see the above-mentioned items being used by Indian farmers, they have left them to be provided by private enterprise in the unplanned, small scale industrial sector, the one which is not subject to government control under the Industries Development and Regulation Act.

In the case of producers' goods for agriculture, it is possible that the reason why the industrial plan did not provide for large scale manufacture may have been the unlikelihood of Indian farmers being able to provide the necessary effective demand. If such was the real reason, provision of credit through government agencies would enable the Indian farmer to buy the producers' goods of the kind referred to, and this increase in effective demand would make their manufacture a commercially feasible proposition. The production of producers' goods on a mass scale could constitute an ambitious piece of industrialization.

The development of agricultural and industrial plans on the lines indicated above would be a measure of rationalization and would lead to considerable economies in expenditure and effort. In a predominently agricultural country like India, industry should be wedded to agriculture. Industrial planning in India appears to have ignored the logic

of Indian economics and to have attempted the establishment of a mainly exotic industrial system in the country. "Food scarcity, foreign exchange difficulties arising from food imports, inflation arising from inadequate production, and loss of export markets have been the results as visible for the last fifteen years."[1] A better picture would probably emerge if industrial planning and agricultural planning were closely related.

Industrial production should endeavor to meet the existing needs of the country in order of their priorities, and should not be considered as an end in itself. If any such priority had been observed, the manufacture of producers' goods for agriculture would have received precedence over hurricane lanterns, cycles, artificial silk, iron goods and a host of other articles, for the production of which factories have been established under the plans and for which foreign exchange has had to be found.[2] It is not that the manufacture of these articles is undesirable, but that the most pressing need in India is to increase agricultural production, and the manufacture of producers' goods necessary for such an increase should have received priority over the manufacture of less urgently needed items.

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[1]Reserve Bank of India, Report on Food Situation in India, 1959, p. 25.

[2]Ministry of Commerce, Report on Industrial Development and Foreign Exchange Prospects, Government of India, 1961, p. 210.

Provision of irrigation facilities

Irrigation has been a major programme for developing Indian agriculture. Within the irrigation programme, major emphasis was devoted at the early stages to the construction of minor irrigation projects, with a view of providing irrigation facilities immediately to farmers. During the first Five Year Plan, it was proposed to bring 8.5 million acres under major irrigation and 11.2 million acres under minor works. The target for the second Plan was a further 21 million acres, about 9 million of which again were to be irrigated through minor works. For the ten years they estimated bringing area under irrigation to an overall total of 90 million acres.[1]

Major and medium irrigation facilities had been provided only to 6.3 million acres by the end of the First Plan; that is, the requisite dams and canals had been built by government agencies. "This is largely because the field channels, which are the obligation of the villagers are not completed, though in some cases the canal system had been badly designed and carried out by government."[2] When a big irrigation project had been carried out, it was the duty

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[1]Planning Commission, Second Five Year Plan, Government of India, 1956, p. 293.

[2]V.T. Krishnamachari, "Facts about Indian Agriculture," AICC Economic Review, (Sept. 1958), p. 7.

of engineers to see that every village got outlets from the canal system at convenient points. In some cases, these outlets had not been provided, but in many cases the delay in utilization was due to the fact that villagers had not been persuaded or advised to construct the field channels for taking the water.[1]

During the Second Plan, it was proposed to bring 12 million acres of land under major projects; by utilizing these and the carryover from the First Plan, 16 million additional acres would become available. At the beginning of 1958-59, the total irrigation potential at head works of large and medium scale irrigation schemes, undertaken during the First and Second Plans, was 10.2 million acres. The potential at the outlet was, however, only 7.25 million acres, while the actual irrigation at the end of 1957-58 was no more than 4.9 million acres.[2] Against the irrigation potential of 7.6 million acres in Kerala State for the period 1955-56 to 1960-61, the actual area irrigated was only 1.2 million acres.[3] The explanation may be found in the following facts.

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[1] P.E.O., National Sample Survey Report on Irrigation in Sample Villages, (Directorate of Economics & Statistics, Government of India, 1959), p. 90.

[2] P.E.O., National Sample Survey, Report No. 10, 1959.

[3] M.L. Dantwala, "The Organizational Approach to the Third Plan," AICC Economic Review, (March 15, 1959), p. 14.

Table 1

BENEFITS FROM IRRIGATION SCHEMES IN KERALA STATE,

1955-56 - 1960-61

End of Year	Million acres (Potential created)	Utilization (Million acres)
1955-56	1.0	.3
1956-57	1.3	.2
1957-58	1.1	.5
1958-59	2.0	--
1959-60 (estimated)	1.1	--
1960-61 (estimated)	1.1	.2

Source: A.U.S. Sastri, Future Prospects of Irrigation in Kerala State (New Delhi: Asia Publishing House), p. 120.

Agricultural credit

One of the important objectives of Indian agricultural policy, since the inception of planning, was the provision of credit to meet agricultural production requirements of the farmers. A majority of the farmers in India have small holdings and they need credit for augmenting agricultural production. This aspect was recognized by the government and it has allotted from 1951 to 1961 nearly RS 2000 million to various agricultural credit institutions.[1]

[1]Planning Commission, Second Five Year Plan, Government of India, 1956, p. 220.

These credit institutions are expected to meet the seasonal credit requirements of the farmers by issuing loans, fertilizers, seeds and pesticides. In 1959-60, while the all India average of working capital per Agricultural Credit Society stood at RS 11,010, and in several states the figure was much lower. In Madras it was only RS 1,852 and in Bengal only RS 3,357.[1] Similarly while the all India average advances per society in the same year was RS 797 and the average per member RS 117, in Madras the average per society was RS 797 and the average per member RS 18.[2] The comparable figures for West Bengal were RS 375 and RS 40.[3]

An attempt was made on a Provincial basis to assess the impact of agricultural credit institutions on meeting the production requirements of the farmers. The data supplied by the Agro-economic Research Centre, Madras, was used to measure the effectiveness and efficiency of agricultural co-operative societies in meeting the credit needs of the farmers in Madras State.

Loan policy

A farmer officially gets a loan from the credit institution on the basis of his credit worthiness and not

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[1] Reserve Bank of India, Report on the Working of Co-operative Credit Societies in Madras, 1959, p. 10.

[2] Ibid., p. 40.

[3] Ibid., p. 65.

on the credit worthiness of the purpose.[1] Morever, loans were issued on the value of fixed property of a farmer, particularly on the value of ownership of his land. This favored land owners, and agricultural credit could not reach the poor peasants who constitute 70 percent of the Indian farmers. The short term loans for seasonal requirements of agriculture should be available easily and in adequate amounts. The amount concerned has not been adequate. The average loan issued by the credit institutions varied from RS 90 to RS 142 (Table 2). This amount was not adequate in view of average requirements of RS 200 per member.[2]

Table 2

AVERAGE LOAN ADVANCED PER MEMBER BY (SAMPLE SOCIETIES)

Year	Large sized societies (RS)	Service Co-operatives (RS)	Primary societies (RS)
1958-59	134	--	84
1959-60	139	68	75
1960-61	129	78	103
1961-62	142.5	90	120

Source: Agro-Economic Research Centre, Agricultural Credit in Madras, 1962, Madras.

[1]Reserve Bank of India, Bylaws of Agricultural Co-operative Credit Societies, New Delhi, 1955, p. 20.

[2]Ibid., p. 45.

There is a rule in agriculture cooperative credit institutions that a member (farmer) of a credit society is not supposed to borrow from other sources. It was because of the inadequacy of supply of credit from the governmental credit institutions that most of the farmers in Madras State depended upon money lenders, who usually charge exhorbitant rates of interest. The result was that the small farmers had to dispose of their produce after the harvest at low prices only to repay their debt to money lenders.

Eight days were taken for getting a loan in 57 percent of cases and the average was 24 days (Table 3). The time involved in issuing loans may discourage farmers and inspire them to seek out a more elastic organization for the fulfillment of their agricultural production requirements.

Economics of agricultural co-operative credit

The main aim of agricultural credit societies is to meet the various credit needs of the farmers at the right time and to issue loans at a low rate of interest, but in the present set-up, the mode of disbursement and repayment of loans imposes heavy burdens on the shoulders of the Indian farmers. A borrower received RS 72.50 Naya Paise out of an RS 100 loan excluding 20 percent loan in kind (Table 4).

Though the paid up share capital and loan in kind would benefit the members in future, they increase the immediate expenditure of borrowing. At the time of issuing of the loan amount, 12 percent of rate of interest is

charged.[1]

Table 3

PERIOD OF APPLICATION AND DISBURSEMENT OF LOANS

Days involved between the date of application and receipt of the loan	No. of borrowers
1 - 7	10
8 - 14	18
15 - 21	15
22 - 28	7
29 - 35	4
36 - 42	6
43 - 49	5
50 - 56	6
57 - 60	4

Source: Agro-Economic Research Centre - Agricultural Credit in Madras, 1962, Madras.

The high rate of interest at the time of disbursement of the loan effects the initiative and enthusiasm of the farmers. The rural credit survey committee appointed by the Reserve Bank of India in 1952 estimated that the agricultural co-operative credit institutions in India have met only 3 percent

[1]Agro-Economic Research Centre, Agricultural Credit in Madras, 1962.

of the credit needs of the farmers in the last ten years.[1] The non-availability of credit facilities have compelled the small farmers to cultivate lands with the limited resources available at their disposal.

Table 4

FINANCIAL CONDITIONS OF A MEMBER'S LOAN FOR RS 100 FOR AGRICULTURAL USE

	RS
Required paid up share capital	12.50
20 percent loan in kind	20.00
Admission fee	1.00
Contribution for village improvement	1.00
Contribution for defense fund	1.00
Interest	12.00
Total	47.50

Source: Agro-Economic Research Centre - Agricultural Credit in Madras, 1962, Madras.

[1]Reserve Bank of India, Rural Credit Survey Report, 1955, p. 95.

The Government of India was unable to provide adequate credit and irrigation facilities during the second Five Year Plan. Secondly, the approach of the Government of India, through framing national schemes of irrigation projects suffered from two major defects. In the first instance, it failed to provide for full use of irrigation potentials. Schemes formulated with reference to general or average situations proved inapplicable or inappropriate in varying measures in particular situations. The best example of defective planning is seen in one of the states of India. "In a state over 350,000 acres were said to be water logged, but no scheme had even been included in the state plan to check effectively this menace and its adverse effects on production."[1] Moreover, the present approach of setting irrigation targets at the Federal level leads to a very low degree of correspondence between expectation and achievement. A plan which attempts a co-ordinated development of all sectors of the economy in all regions and locations must attain a high degree of specificity. It must also attempt a full use of the potential in irrigation.

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[1] *Ibid.*, p. 96.

CHAPTER III

INDIAN CROP PRODUCTION UNDER ECONOMIC PLANS

Food grain production

The amount of total food grain production by the end of the second Five Year Plan was 75 million tons instead of 81.8 million tons projected as its target by the government (Table 5).

Table 5

FOOD GRAIN OUTPUT, PLAN AND PERFORMANCE 1950-51 - 1960-61

Year	Plan targets	Grain Production
	(million tons)	
1949-50	55	54.2
1950-51	50.7	52.2
1951-52	--	52.9
1952-53	--	58.8
1953-54	--	68.9
1954-55	--	67.1
1955-56	62.5	65.8
1956-57	--	68.8
1957-58	--	62.5
1958-59	--	73.5
1959-60	--	70.0
1960-61	81.8	75.0

Source: Planning Commission, Second Five Year Plan, 1956, Government of India, p. 120.

Analysis of targets in the first two plans

C. D. Deshmukh and Vakil expressed dissatisfaction over the performance of Indian agriculture with special reference to food grain production and referred to the fact that the second Five Year Plan did not reach its target.[1] They have judged agricultural performance on the basis of failure in the targets, but the targets did not have a realistic basis. The production of food grains showed that India's first Five Year Plan set out to increase food grain production from 55 million tons in 1949-50 to 62.4 million tons in 1955-56. The actual production of food grains in 1955-56, which was an extraordinarily good harvest, exceeded the target and reached 65.8 million tons. The Planning Commission, as a result of two good crops in 1954-55 and 1955-56, over-optimistically projected the target at 81.8 million tons of food grains for 1960-61--a figure about 23 percent above the 1955-56 actual production. If the output were normal in 1955-56, food production would have been about 64 million tons rather than 65.8 million tons and the cumulative rate of growth in the six years (1950-51 to 1955-56) should be taken at about 2.5 percent per year. At this rate, the target for 1960-61 should have been 73 million tons, whereas the target actually set was 81.8 million tons by the Planning Commission.

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[1] C.D. Deshukh, Indian Agriculture and its Future Prospects (Madras: The Metropolitan Publishers, 1960), p.12; and K. Vakil, Problems of an Underdeveloped Economy (New Delhi: Asia Publishing House, 1962), p. 110.

A close look at the expenditure allotted to agriculture, both in the first and second Five Year Plans, provided the rationality of the government in setting the targets. The purpose of this analysis is to find out whether there was any relationship between the overly optimistic target of food grain production in the second Five Year Plan and the allocation of outlays by the government.

The amount of expenditure allotted to agricultural production in the first Five Year Plan was small compared to the second Five Year Plan (Table 6). The expected grain production became unreasonable if the outlay in relation to the targets of food grain production were compared. Out of the total amount of RS 2,400 million in the first Five Year Plan allotted for various agricultural programmes such as animal husbandry, fisheries and cooperation, RS 1,960 million were given to grain production which was 81.7 percent of the total. The increase of food grain production was 14 percent. Out of RS 3,410 million allotted for various agricultural programmes in the second Five Year Plan, RS 1,700 million were allotted for food grain production which was 49.9 percent of the total. The expected increase in food grains was 23 percent.

Objectives of agricultural policy in the first Five Year Plan

The Planning Commission of the Government of India had decided at the beginning of the first Five Year Plan to

provide the following facilities by the end of the Plan: minor irrigation facilities for 11.2 million acres of land; major irrigation facilities for 8.5 million acres of land; reclamation of land up to 7.4 million acres; and fertilizers to farmers--nitrogen, 0.61 million tons, superphosphates 0.176 million tons, and bone meal 0.5 million tons. Any shortage in the estimated objectives would of course automatically reflect in the amount of food production.

Table 6

TOTAL AMOUNT OF MONEY ALLOTTED TO VARIOUS AGRICULTURAL PROGRAMMES

Item	First Plan	Percentage of total	Second Plan	Percentage of total
	(RS Million)*		(RS Million)*	
Agriculture	1960	81.7	1700	49.9
Animal Husbandry	220	9.2	560	16.4
Forestry	100	4.2	470	13.8
Fisheries	40	1.6	120	3.5
Cooperation and warehousing	70	2.9	470	13.8
Miscellaneous	10	0.4	90	2.6
Total	2400	100.0	3410	100.0

Source: Planning Commission, Second Five Year Plan, Government of India, 1956, p. 238.

*One Canadian Dollar = RS 7

The Planning Commission decided to achieve an increase of 6.5 million tons of food production by fulfilling the input objectives by the end of the first Five Year Plan (Table 7). The provision of targeted inputs by the end of the first Five Year Plan showed that the government had failed to meet the requirements of agricultural production. On the basis of partial fulfillment of inputs, an increase of 5.54 million tons of grain production can be expected by the end of the plan (Table 8).

The one general target in the second Five Year Plan was set at 81.8 million tons of grain, an increase of 16 million tons over the first Five Year Plan. The Planning Commission in the second Plan also projected the input objectives which they wished to implement by the end of the Plan. An attempt was made to see whether the government succeeded in providing the inputs to the millions of farmers by the end of the second Five Year Plan (1960-61). The Planning Commission determined an interrelationship between the inputs and expected output (Table 9).

The analysis of the date of performance with special reference to input objectives indicated that the Government of India had not succeeded by the end of the Second Plan in providing the required inputs which were the essential prerequisites for increasing agricultural production.

Table 7

FIRST FIVE YEAR PLAN OBJECTIVES AND ESTIMATED PRODUCTION

Item	inputs	outputs
Minor irrigation	11.2 mil* acres	1.78 mil tons
Major irrigation and medium irrigation	8.5 " "	2.01 " "
Reclamation of land	7.4 " "	1.51 " "
Fertilizers (Nitrogen)	0.61 " "	0.65 " "
Super phosphates	0.176 " "	N.A.
Bone meal	.05 " "	0.56 " "
	Total	6.51

Source: Planning Commission, First Five Year Plan, 1951. Government of India, p. 210.

N.A. = Not Available.

*mil = million

Table 8

FIRST FIVE YEAR PLAN TARGET, PERFORMANCE AND ITS RELATION TO FOOD GRAIN PRODUCTION

Item	Projections	Inputs provided	Food Production in response to inputs *
Minor irrigation	11.2 mil acres	10.0 mil acres	1.8 mil tons
Major irrigation and medium irrigation	8.5 " "	6.3 " "	1.5 " "
Reclamation of land	7.4 " "	7.4 " "	1.59 " "
Fertilizers (Nitrogen)	0.61 " tons	0.61 " tons	0.65 " "
Super phosphates	0.176 " "	N.A.	--
Bone meal	.05 " "	N.A.	--
		Total	5.54

Source: Planning Commission, Second Five Year Plan, Government of India, 1955, p. 280.

*Actual grain production is calculated.

Table 9

EXPECTED OUTPUT FROM PROGRAMMES UNDER THE SECOND PLAN

Item	Programme	Expected output from the programmes
Major and medium irrigation	12.0 mil acres	4.4 mil tons
Minor irrigation	9.0 " "	2.8 " "
Fertilizers	1.8 " tons	2.5 " "
Improved seed	.0093 " acres	3.0 " "
Land reclamation	1.5 " "	1.8 " "
General improvement in agricultural practices	2.0 " "	1.5 " "
	Total	16.0

Source: Planning Commission, Second Five Year Plan, Government of India, 1956, p. 130.

On the basis of physical achievement of programmes, one could expect only an additional increase of 8.67 million tons over the figures of 1955-56 (Table 10). It was remarkable that India could achieve a figure of 75 million tons, instead of 73.6 million tons. In any case, it was too much to expect the realization of a target of 81.8 million tons without providing the necessary inputs for the fulfillment of the target.

Table 10

TARGETS, PERFORMANCE AND PRODUCTION OF FOOD GRAINS UNDER THE SECOND PLAN

Item	Projections	Inputs provided	Production in response to inputs*
Major and medium irrigation	12.0 mil acres	6.9 mil acres	2.53 mil tons
Minor irrigation	9.0 " "	9.0 " "	2.8 " "
Seed farms	.004 " "	.002 " "	0.5 " "
Fertilizers, including imports	1.8 " tons	.3 " tons	0.41 " "
Reclamation of land	1.5 " acres	1.2 " acres	0.6 " "
Area under improved seed	.093 " "	.055 " "	1.83 " "
Land improved through C.T.O. and S.T.O.**	2.0 " "	N.A.	N.A.
		Total	8.67

Source: Planning Commission, Third Five Year Plan, Government of India, 1961, p. 392.

* Actual grain production is calculated.

**C.T.O. = Central Tractor Organization; S.T.O. = State Tractor Organization.

The important reason for the non-fulfillment of inputs during the second Five Year Plan was that it was hoped to meet the dimensions and objectives laid down by state plans for agriculture. These plans were built on local plans with the district on the base, but the state plans did not reflect this interdependence. At the block and the district level, competence in planning was lacking and at the state level intimate knowledge or familiarity with local conditions and problems was absent. Corrections which could have been brought about immediately through close consultations were made difficult because of the usual impediment of official communication and red tape.[1] "The consumption of fertilizers was seriously affected due to the shortage of foreign exchange difficulties since 1959."[2] In April 1959, a team of American economists who visited India reported to the government its conclusion that an immediate and drastic increase (in grain output) is India's primary problem for the next seven years in the light of food shortage. In their view the situation needs a crash programme, rather than the simple extension of past efforts.[3]

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[1] P.E.O., National Sample Survey Report (Directorate of Economics and Statistics, 1959), p. 270.

[2] United Nations, F.A.O., New York, 1957, p. 110.

[3] Ford Foundation, Report on India's Food Crisis and Steps to Meet it, Government of India, 1960, p. 250.

Objectives in the Third Plan

In the period of the Third Plan, the Planning Commission had established an increase of 25 million tons of food grains over the second Plan period. The rate of increase was 30 percent, whereas in the second Plan they set a rate of growth of 23 percent in the field of food grains. It was one of the important aims of the Planning Commission to remove technical and administrative deficiencies in the execution of agricultural development plans by the end of the third Plan.[1] This showed that the need for an increase of inputs had been recognized in formulating the target of outlays in the third Five Year Plan.

The provision of inputs, even in the third Plan after ten years of planning experience, was not successful (see Appendix I Table 18). The rate of consumption of certain types of inputs like irrigation facilities, soil conservation, dry farming, and improved seed year by year fell short of targeted amounts. The slow rate of progress in agriculture in the third Five Year Plan might be, to a considerable extent, due to the failure of industry, power, and irrigation, to supply the growing needs of agriculture.

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[1] Planning Commission, Third Five Year Plan, Government of India, 1961, p. 320.

Moreover, it is unreasonable to expect a notable progress in agriculture without a corresponding achievement in industrial development. "A revolution in Indian agriculture is unthinkable in terms of something happening to agriculture alone. It is to be thought of as a series of interchanges between agriculture and industry with rising intensity."[1] The basic concept of balanced economic development was lacking in Indian agricultural plans for the last fifteen years.

Individual crop production analysis

Indian agricultural production as a whole had increased 36.4 percent during this period, the increase in the average yield per acre was only 18.6 percent during this period, the other half of the increase in production being accounted for by the increase in acreage brought under cultivation (Table 11). The largest increase in yield per acre took place in the case of gram 29.5 percent, rice 27.4 percent, ragi 23.8 percent, jowar 23.3 percent, bajra 18.6 percent, wheat 17.8 percent and maize 11.8 percent. Of the fibres, cotton

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[1] Asoka Mehta, Agricultural Revolution in India (Madras: Metropolitan Book Stores, 1959), p. 23.

Table 11

PERCENTAGE INCREASE IN AREA, YIELD PER ACRE, AND PRODUCTION IN 1958/59-1960/61 OVER 1949/50-1951/52

Crop	Area	Yield	Production
	(acres)	(lbs.)	(tons)
Rice	9.8	27.4	39.9
Jowar	6.8	23.3	31.7
Bajra	8.1	18.6	28.2
Maize	31.9	11.8	47.5
Ragi	9.9	23.8	36.1
Small millets	-1.4	12.1	10.5
Wheat	32.1	17.8	55.6
Barley	4.2	7.9	12.4
Gram	30.7	29.5	69.3
Tur	3.8	-5.7	-2.1
Other pulses	19.5	-7.8	10.0
Ground nut	25.5	12.1	40.7
Seasamum	-9.0	4.6	-4.8
Rape and mustard	27.9	8.8	39.1
Flaxseed	21.7	-3.8	17.1
Castor	-7.8	14.0	-6.4
Cotton	30.1	20.7	57.0
Jute	11.0	6.4	18.1
Mesta	34.5	9.1	38.1
Sugar cane	60.5	15.6	85.1
Potato	40.2	10.6	55.0
Tobacco	14.0	-2.9	10.7
Pepper	17.2	5.0	23.3
Chillies (dry)	7.7	-2.4	5.1
Ginger (dry)	-13.6	19.3	1.8
All crops	15.0	18.6	36.4

Source: Index numbers of area and production were provided by the Ministry of Food and Agriculture, Government of India, for the years 1949-50 to 1951-52, and for 1958-59 to 1960-61. Taking the average of the 3 years ending with 1960-61 as a percentage of that of the 3 years ending 1951-52, the increase in area, yield per acre and production of different crops were calculated for the 10 years of the first two plan periods.

increased 20.7 percent, mesta 15.6 percent, and jute 6.4 percent; while in the case of oil seeds, the increase in yield per acre had been low and was actually negative in the case of flax seed. There had been a noticeable fall in the yield per acre in the case of pulses other than gram, tur showing a fall of 5.7 percent.

Nearly half the agricultural production in the last decade was due to increased area brought under cultivation year by year. It means that the land has not been intensively exploited to the maximum extent. The increase of 30 percent food grain production by the end of the third Five Year Plan (1966) may not be possible because of the fact that there is no longer much scope for increasing the area under cultivation in future agricultural plans. An investigation carried out by the National Council of Applied Economics Research Centre, New Delhi, came to the conclusion that at the present pace of expansion of area under cultivation, India will reach the maximum limit of extensive cultivation by the end of 1975.[1] Increases in productivity or yield per acre is the only solid and enduring base for future progress of Indian agriculture. The highest percentage increases in acreage were recorded by sugar cane, wheat, maize, gram and jute. The lowest percentage increases were recorded by tur, barley, rice, jowar and bajra (Table 12).

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[1]NCAER, "Extensive Cultivation in India", Indian Express, (New Delhi, Jan. 16, 1965).

Table 12

ACREAGES OF VARIOUS CROPS, INDIA 1949-52 AND 1958-61

Crop	Annual average of three years 1949-50 to 1951-52	Annual average of three years 1958-59 to 1960-61	Rise in acreage	Percentage rise in acreage
	(thousand acres)			
Rice	75,106	82,534	7,428	9.9
Jowar	39,561	42,283	2,722	6.9
Bajra	25,524	27,604	2,080	8.1
Maize	8,067	10,640	2,573	31.9
Ragi	5,435	5,972	573	9.9
Wheat	24,083	31,811	7,728	32.1
Barley	7,838	8,168	330	4.2
Gram	18,802	24,573	5,771	30.7
Tur	5,664	5,883	219	3.9
Other pulses	23,959	28,608	4,649	19.4
Sugar cane	462	741	279	60.4
Small millets	12,522	12,361	-161	-1.3
Jute	14,798	19,234	4,436	30.0
Cotton	1,508	1,675	167	11.1

Source: Ministry of Food and Agriculture, Government of India. Triennial averages are calculated.

An amazing feature in the light of low food grain production was the lower precentage rise of the acreage of rice. The important evidence provided by the analysis was that sugar cane, though it was a commercial crop, claimed the highest percentage increase of acreage among the crops, including food grain crops. The reason for the sharp increase of acreage of sugar cane was due to high prices guaranteed by the government and the various incentives offered to co-operative sugar factories. Moreover, the data supplied by studies in economics of farm management, Bihar, showed a close correspondence between the movements in price parity ratios and the changes in sugar cane acreage (see Appendix I, Table 19). Whenever the price ratios moved in favour of sugar cane, this resulted in an expansion in sugar cane acreage. Provision of a guaranteed minimum price for sugar cane from season to season on the basis of quantity regardless of the quality of the cane, the provision made for an additional price entitlement out of the net price realized by the sugar factories, the obligations vested with the sugar factories--under the different State legislations in regard to meeting their requirements of sugar cane supplies--all these have resulted in providing incentives directly and indirectly for sugar cane acreage expansion.[1]

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[1] P.E.O., Report on Prices of Individual Crops in India, Ministry of Food and Agriculture, Government of India, 1960, p. 25.

Area planning of crop production

In the light of the non-fulfillment of food grain targets, this large expansion of sugar cane acreage meant that important alternative crops were reduced. Even if the entire increase in acreage under sugar cane in the three Northern States (Bihar, Panjab and Uttar Pradesh) had been brought under food grain crops, production of sugar cane at about 8 million tons would still have reached its second Plan target.[1] The reason was that the northern states were inefficient in sugar cane production as compared to southern states. Nearly a million acres of land could have become available in the northern states for the production of grain crops, which in terms of wheat would have meant a production of about half a million tons.

The average yield per acre in the northern states, whose acreage of sugar cane cultivation was exceeded in the second Plan, was only one half of the average for the southern states. Thus, without affecting the present level of sugar cane production, about 50 percent of the area under sugar cane in the northern states, that is roughly 2.2 million acres, could be released for production of other food crops. The yield per acre was low in northern states compared to southern states. In spite of low yield rates, there had been a sharp increase of acreage brought under cultivation of sugar cane in the northern states (Table 13).

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[1] Planning Commission, Second Five Year Plan, Government of India, 1956, p. 25.

Table 13

AREA, PRODUCTION, AND YIELD PER ACRE OF SUGAR CANE IN IMPORTANT SOUTHERN AND NORTHERN STATES, 1960

	All India	Important Southern States*	Important Northern States**
Area under sugar cane (thousand acres)	5,789	846	4,406
Production of sugar cane (thousand tons)	10,447	2,647	7,061
Yield per acre in lbs. (in terms of gur)	4,042	7,059	3,590

Source: Directorate of Economics and Statistics, Statistical Abstract, Government of India, 1961, p. 298.

*Southern States comprise Andhra Pradesh, Madras, Bangalore and Kerala.

**Northern States comprise Panjab, Bihar, Utter Pradesh and Madhya Pradesh.

Instrument for regulating acreage

The third Plan explicitly stated "that the price policy must ensure that the movements of relative prices accord with priorities, and targets that have been set in the Plan."[1] In this connection it is relevant to refer to Clark's article in which he stated that it was possible to assess with reasonable precision the amount of the shifts

[1]Planning Commission, Third Five Year Plan, Government of India, 1961, p. 19.

in acreage in response to a change in price. He estimated, on the basis of data for East Bengal, India, that a rise of 50 percent in prices of jute, rice prices remaining the same, brought about an increase on an average of about 395 thousand acres in the area under jute. On the other hand, a decline in the price of jute by 50 percent, with rice prices remaining the same, caused a reduction on an average of 667 thousand acres.[1] The important point is that apart from the details of operational problems, it seems possible to regulate the acreage under the crops by a suitable manipulation of the parity ratios by the Government of India.

Although the price policy was recognized in principle in the Five Year Plans, no definite policy appeared to have been followed The inclusion of area targets in agricultural plans in future may not allow shifts in production resulting mainly from the shifts in acreage.

The yields of rice in India have been very low, and half of the increase in agricultural production in the last decade has been due to new area brought under cultivation. New lands brought under the plough in future will be only a minor fraction of the total land under cultivation. Moreover, land already cultivated has not been exploited to the maximum extent. The question arose as to whether there was any possibility of increasing yields on the land which was

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[1]Ralph Clark, "The Economics of Determinants of Jute Production," F.A.O., Monthly Bulletin of Economics and Statistics (Sept. 1957).

already under cultivation. That the improvement of the yield from the old land can be brought about was proved by experiments. A small group of Japanese farmers were sent to work in North India in 1958. Although India's average yield per acre was only one third of Japan's, the group soon succeeded in raising the yield at a village in North India to 10 percent above the Japanese average itself.[1] This striking result was achieved by a combination of deep ploughing, heavy application of fertilizers, better seed selection. Another experiment with the use of fertilizers conducted by the United Nations in a number of Asian countries, including India, demonstrated the ability of the Indian soil to give more yields when fertilizers were effectively used. Recent experiments in a number of these countries showed that striking increases in yields can be obtained by applying mixtures of nitrogenous, phosphatic and potash fertilizers on adequately watered lands. The resulting increased rice yields were 31 percent in the Republic of Vietnam, 55 percent in Ceylon, 77 percent in Burma, 86 percent in India, and 84 percent in the Phillipines.[2] An experiment carried out by the National Council of Applied Economic Research Centre at New Delhi, came to the conclusion that one ton addition of fertilizers in India results in an increase of ten tons of

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[1]United Nations, F.A.O. Year Book, 1957, p. 20.

[2]Ibid., p. 35.

food grains.[1] The above experiments showed the importance of fertilizers in raising the output of agriculture, and the potential of Indian soil to higher yields in the future.

The problem of the inability of the government to fulfil the input objectives, with special reference to fertilizers during the second Five Year Plan, illustrated the lack of overall thinking and of coordination of activities of various ministries. The Agricultural Administration Committee mentioned in its report that it was generally felt in the states that sufficient fertilizers are not being allotted to them by the government. In view of the central position held by fertilizers, it is very difficult to underestimate the importance of an adequate supply.[2] Another defect in the present agricultural policy was that there was relatively little connection between research and its application. The Royal Commission on Agriculture noticed this defect and stated that the experimental stations in the country have collected scientific information on fertilizer requirements of crops and this has not been translated into practical application.[3] At the same time, to take action on experiments without caring to see whether they have been translated into practical

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[1]National Council of Applied Economics Research, "Fertilizer Experiments on Indian Soil," Indian Express, (Jan. 19, 1966), p. 10.

[2]Ministry of Food and Agriculture, Report of the Agricultural Administration Committee, Government of India, 1958, p. 43.

[3]Ibid., p. 56.

application, will jeopardize the success of agricultural planning and lose the confidence of the cultivators in research and the government's agricultural policy.

CHAPTER IV

TECHNOLOGY IN INDIAN AGRICULTURE: A CASE STUDY

An intensive field study of one of the 19 villages in Emani Block in South India was carried out in September 1964. A block is an administrative unit which looks after the development of 15 to 20 villages. The purpose of the study was to examine the working of community development with a view to pinpointing the handicaps under which the programme operated and the conditions in which it was easily assimilated. The approach was more promotional than critical. The idea was to find out the responsiveness of farmers to improved methods of cultivation introduced by community development.

Region and people in Emani Block

This region presented a few broad agro-economic characteristics. The block had a fertile stretch of land with a fair spread of rainfall. There was a measure of assurance and stability of agricultural conditions about the region. The cropping practices had attained a stage which did not provide any regular provision for fallowing. The cropping pattern would mean a highly judicious and well maintained pattern of sustaining soil fertility of an excessive exploitation of land. The crops ranged from exclusively cash crops like tobacco and turmeric and irrigated fruits and vegetables, to the combination of medium cereals, pulses and rice of lower grade, quality,

and productivity under conditions of not too satisfactory farming due to non-availability of inputs and credit supply. The poverty in most of the villages was acute and unemployment and underemployment considerable.

Salient features of the study village

The village of Duggirala was selected for intensive study. Distance between the selected village and the Block headquarters was eight miles. The main source of irrigation was through canals. The staple food crops in this area were rice, bajra, vegetables, and the commercial crop was turmeric. This village was fairly representative and largely resembled, in its social class structure, soils and climatic conditions and the crops, the neighbouring villages. The land classification and grouping, the cultural practices and the configuration of fields and farms and even the pattern of land holdings were very similar. A study of the farm economy and structure of the village would bring out the representative character of the block. The collective analysis and its individual examination reflected the best and the worst of the block. Since 1956 Dugirala Village has been under the administrative control of the Community Development Block. According to the 1961 census, the village had a population of 13,500. The village had the following facilities: a primary school, a local library, a railway station, a Mahila Mandal, a post office, a veterinary hospital and electric facilities. It was connected with important marketing centres by roads.

The information obtained from the farmers indicated both a promising and disappointing trend. The majority of farmers had taken the opportunity of introducing improved implements on their own initiative. The extension agencies, whose major function lay in inducing the farmers to adopt improved implements, made little contribution in effecting it. Only one farmer, and he belonged to the largest size group, reported some inducement from the extension agency to the introduction of new farm implements (Table 14).

Technological change and the farmers' response

In order to have an idea of the extent of the technological change that has occurred in agriculture, it was assumed worth while examining the extent of the spread of improved agricultural practices. The purpose was to find out whether farmers were responsive to scientific methods of cultivation once they were induced and informed about the profitability and advantages of improved methods of cultivation. It was found out that only a few of the farmers knew of improved agricultural practices before 1956 (before the introduction of community development). The practice of crop changes had been accepted by about 10 percent of the farmers. The Japanese method of paddy cultivation was not known to the farmers before 1956. Most of these practices were adopted after 1956 (Table 15).

The brief study of adoption of improved practices provided an interesting example of farmers' response to

Table 14

DISTRIBUTION OF LAND HOLDINGS BY REASONS FOR ADOPTION OF IMPROVED IMPLEMENTS - 1956-64

Total holdings (acres)	Own initiative	Plan effect	Community development block	Demon-stration effect	Other reasons	Total no. of fami-lies adopted improved implements	Rest	Total
	Reasons for adoption of improved implements by farm families							
1 - 10	8	--	--	1	1	10	118	128
10 - 25	18	--	--	1	--	19	49	68
25 - 50	12	--	--	--	--	12	11	23
50 & above	4	--	1	--	3	8	5	13
Total	42	--	1	2	4	49	183	232

Source: Village Records, Duggirala region, South India, 1964

Table 15

INTRODUCTION OF JAPANESE METHOD OF CULTIVATION BY FARM SIZES - 1956-64

Size group (acres)	Total number in the group	Paddy sowing at close spaces		Crop rotation		Crop combination		Crop changes		Deep ploughing		Green manuring		Seed mixing with cultivation		Mixed farming		Other practices	
		Number of families adopting the practice and year of adoption																	
		1956	'64	'56	'64	'56	'64	'56	'64	'56	'64	'56	'64	'56	'64	'56	'64	'56	'64
1-10	128	--	33	1	37	2	28	--	4	--	--	--	--	--	--	--	1	--	1
10-25	68	--	34	2	32	1	28	--	12	--	3	1	1	--	1	--	1	--	--
25-50	23	--	16	--	12	--	14	1	3	--	4	--	1	--	--	--	--	--	--
50 & above	13	--	8	--	8	--	9	1	6	--	4	--	4	--	2	--	--	--	--
Total	232	--	91	3	89	3	79	2	25	--	11	1	6	--	3	--	2	--	1
Percentage to the total			39.22	1.29	38.36	1.29	34.05	0.86	10.78	--	4.74	0.45	2.59	--	1.29	--	0.86	--	0.43

Source: Village Records, Duggirala region, South India, 1964.

technological change. The short period of eight years meant a tremendous shift in this field. The rate at which new practices had been adopted in encouraging the change of cultivation can be attributed to the efforts made by the community development centre as well as the farmers in the region. The chief reason for adopting improved practices might be to a large extent due to small amount of outlay and their advantages over the traditional methods of cultivation which had been replaced by the farmers over a short period of time.

The amount of agricultural productivity per acre depended upon the type of crop cultivated. As to the question about their attitude towards gross output, they said they were not happy with the amount of present production. A majority of the farmers expressed confidence that they would increase yield per acre two to three times what they are now producing, through heavy application of chemical fertilizers.

Use of fertilizers

Questions were asked to elicit reasons for low level of fertilizer application and 81 percent of the families in the region expressed dissatisfaction over the adequacy of fertilizer supply. The main reasons for low amount of fertilizer application were due to non-availability of adequate supplies at the right time, together with the lack of purchasing power by the farmers, particularly the

small cultivators (Table 16).

Table 16

OBSTACLES TO USE OF FERTILIZERS IN

THE DUGGIRALA REGION, 1964

Obstacles	Size of holding		
	1 - 10 acres	10 - 25 acres	Above 25 acres
	(Percentage of total families in the group)		
Supply not available	11.9	27.5	66.7
Could not afford to buy	66.7	57.5	20.8
Others	21.4	15.0	12.5
Total	100.0	100.0	100.0

The information on types of fertilizers used in the last eight years showed that the majority of farmers have been applying manures such as cow dung and green leaves instead of chemical fertilizers, such as nitrogen, ammonium sulphate, etc. The small farmers relied entirely on farmyard manure (cow dung, green leaves) for cultivation (Table 17).

Table 17

RELATIVE IMPORTANCE OF SOURCES OF FERTILIZER SUPPLY

IN DUGGIRALA REGION, 1964

Sources	Percent		
	1 to 10 acres	10 to 25 acres	above 25 acres
Farmyard manure	81.19	77.82	70.51
Oil cakes	18.45	19.02	24.23
Manure Mixture	0.36	1.39	3.24
Ammonium Sulphate	--	1.77	2.02
Total	100.0	100.0	100.0

CHAPTER V

AGRICULTURAL PRODUCTIVITY IN INDIA

Farm size and efficiency

Acreage consist of fertile and non-fertile land and hence, due care is taken to standardize the land for the measurement of efficiency. Yield per acre is chosen as a criterion for measuring the agricultural productivity in India.

Output is a general measure of size rather than acreage and hence there was great tendency among the people to use it. The simplest measure of output may appear to be in physical weight or volume, but this measure would not take into account the high income yielding crops and low income yielding crops and their differential values. The method used in measuring the productivity was in terms of monetary values. Value was also imputed to the retained output of farmers in the light of underdeveloped conditions. The ratio of retained output to sold output changes with the size of the farm, so due consideration was given in the form of setting a value on the retained output before measuring the output of farms. In this analysis farm size was defined by acreage and efficiency by returns per acre. The cost of farm-produced inputs--family labour, owned land, and farm-produced capital were imputed costs. The prices of imputed costs were calculated on the basis of the opportunity cost of these inputs.

This study of size efficiency relationship was based on the following definitions of costs and returns: Total Cost = Paid out cost plus retained cost; Gross output = Paid out and retained costs plus farm business income; retained cost = family labour, and owned bullock labour; gross output minus paid out cost (inclusive of depreciation) = farm business income; farm business income minus retained cost = Net profit.

Size of farms

According to the 1961 census, the average size of holding in India worked out to 7.71 acres (see Appendix I, Table 21). There was considerable variation regarding the average size of holdings in different states. The states of Panjab, Rajastan, Madhya Pradesh, Gujarat, Maharastra and Mysore, which belong to northwestern and southwestern regions of India, had holdings which are three or four times higher than those of the eastern region, and five to seven times in relation to Kerala. The average size in pure tenancy holdings was the lowest and varied from 2 to about 7 to 10 acres in Panjab, Rajastan, Gujarat and Maharastra, both in rural and urban areas. The average size of mixed tenancy holdings was the highest in each of the various states in India, excluding Uttar Pradesh. Moreover, the average size of holding was higher in urban areas compared to rural areas in all the states.

A significant proportion of the cultivated area in many states is found in holdings exceeding 5 acres. According to Indian standards of living, holdings with an average size exceeding 5 acres are considered to be economic holdings. Thus, in those areas where the major proportion of cultivated area is located in economic holdings, the argument that agricultural productivity suffers because of small holdings, naturally does not hold good.[1] The causes for low productivity might have to be sought elsewhere.

The analysis of the data is based on different sizes of holdings. The data of the three states, Uttar Pradesh, Madhya Pradesh, and West Bengal are based on two districts in each province. The analysis showed the per farm as well as per acre returns, where returns themselves are of three types (see Appendix I, Tables 22, 23, 24): (1) gross output; (2) farm business incomes; and (3) net profits. As acreage expands, per farm gross output, farm business income, and net profits all increase in each of the three states. The interesting question, however, is not whether farm returns increase by size, but whether per acre returns do so. Part B of the tables lends to the following conclusions:

(1) As farm size expands (acres) farm business income per acre declines in small holdings rather than in large holdings.

(2) As farm size (acres) expands, gross output per acre declines.

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[1]Nasir Ahmad Khan, "Size of Holdings in India," AICC Economic Review (New Delhi, 1941).

(3) As farm size (acres) expands, net profit per acre increases.

Some explanation of the behaviour of returns

The important reason for gross output per acre varying inversely and for net profits to vary directly with farm size was due to a number of factors. The large farms in India (over 10 acres) were markedly underutilized in terms of intensity of cultivation. The reason for underutilization of land on large farms was absentee landlordism. They were not interested in exploiting the land to the maximum extent through personal supervision and spent most of their time in towns. The small farmers had been cultivating farms very intensively compared to large farmers in the three states. Secondly, the reason for the low gross output in large farms was that the proportion of family labour to hired labour declined with the size of farms. In the context of Indian traditions, attitudes and behaviour a unit of family labour did more or better work than a unit of hired labour, and the product would be larger for the former even if the quantities of labour applied were the same in both cases. So the increase in the proportion of hired to family labour, as farm size expanded, has given a smaller per acre product.

There has been a declining gross output per acre with the expansion of farm size in all of the three states. In order to bring about this relationship clearly, the relationship between returns per acre and size of farm is presented in the form of figures to all the three states (Fig. 1, 2, 3).

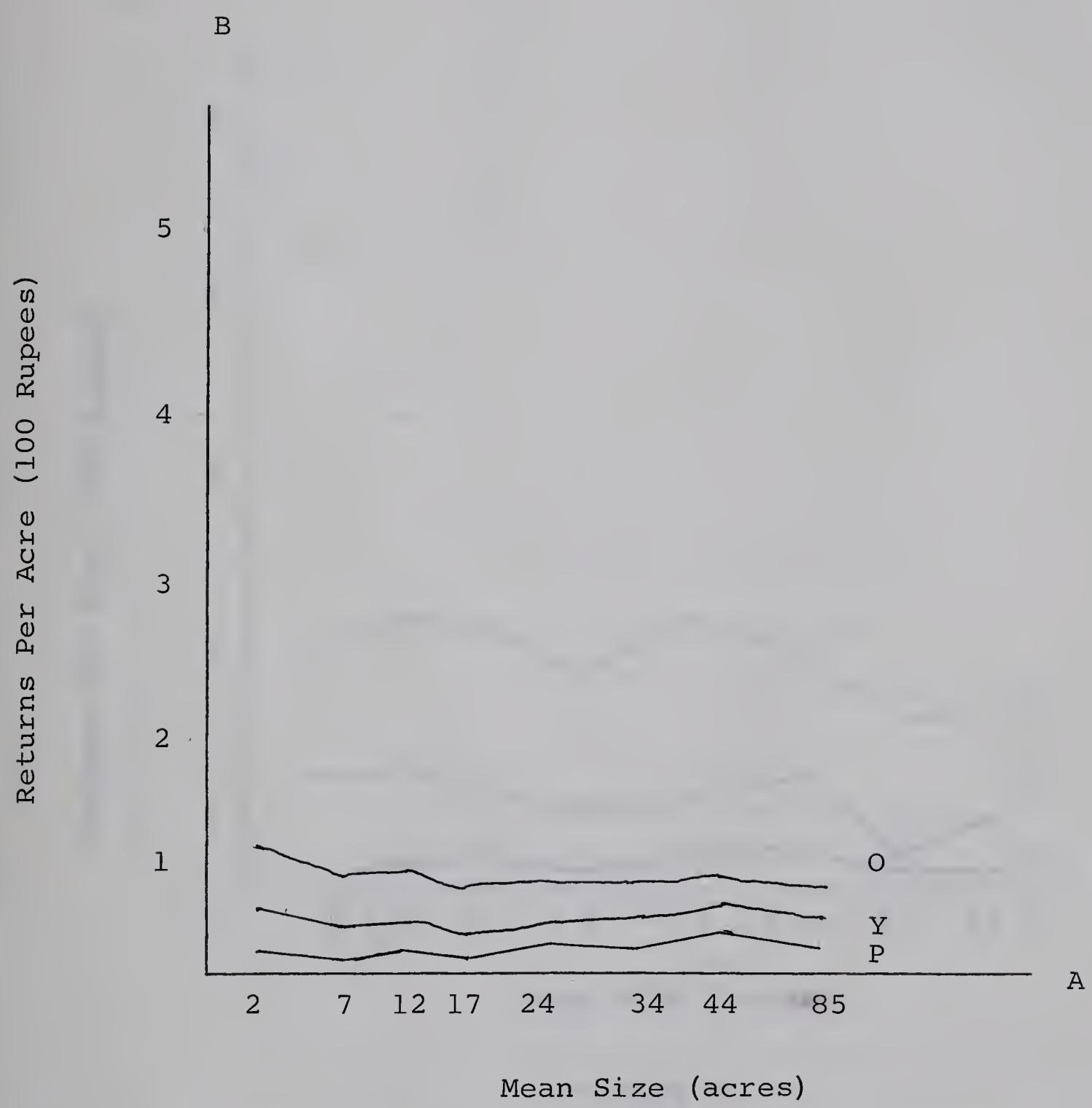

Figure 1

Returns Per Acre by Size of Farm (acreage)

Source: Directorate of Economics and Statistics, Studies in Economics of Farm Management, Madhya Pradesh State, 1960.

O = Gross Output
Y = Farm Business Income
P = Net Profits

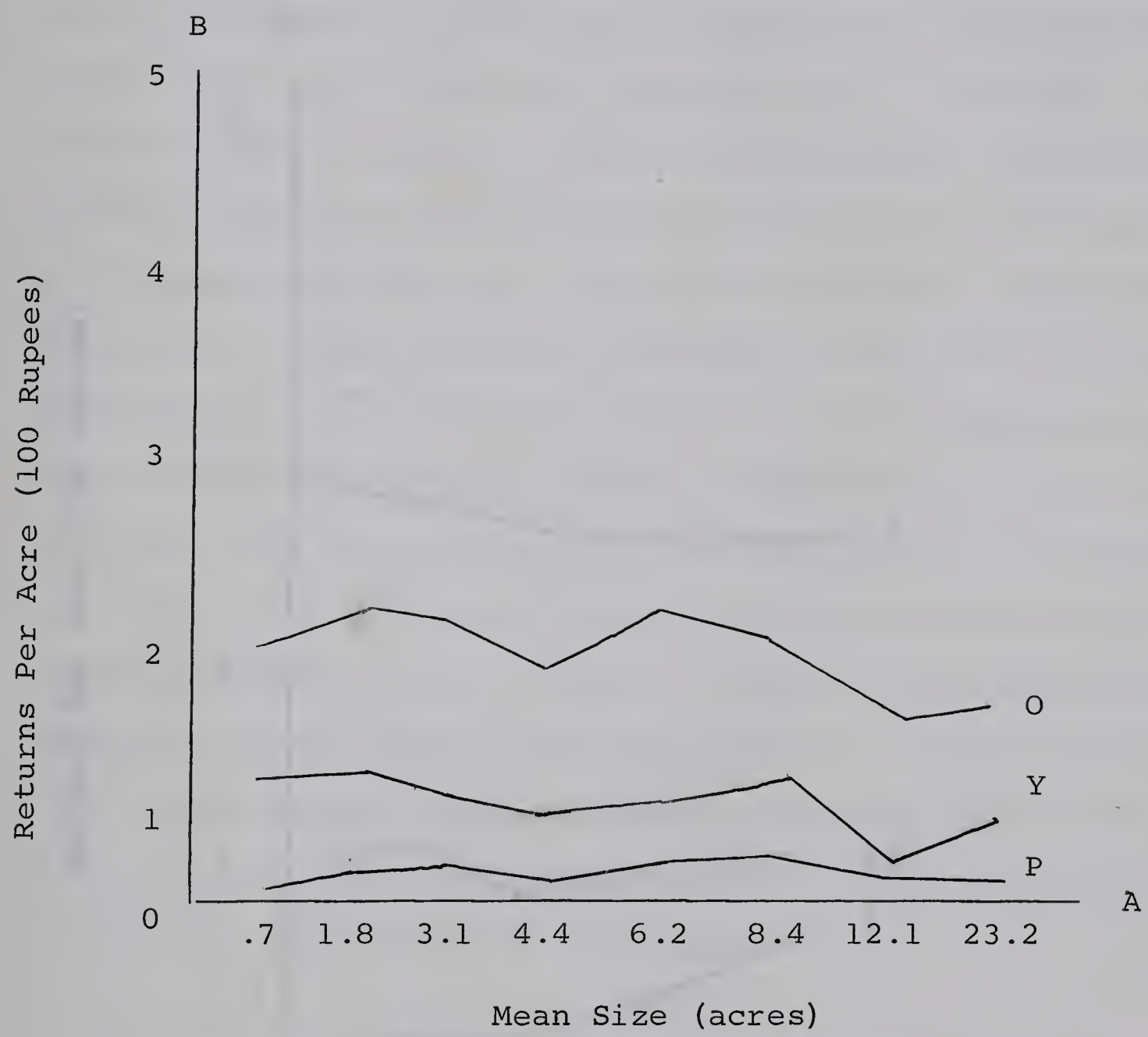

Figure 2

Returns Per Acre by Size of Farm (acreage).

Source: Ibid., West Bengal State, 1960

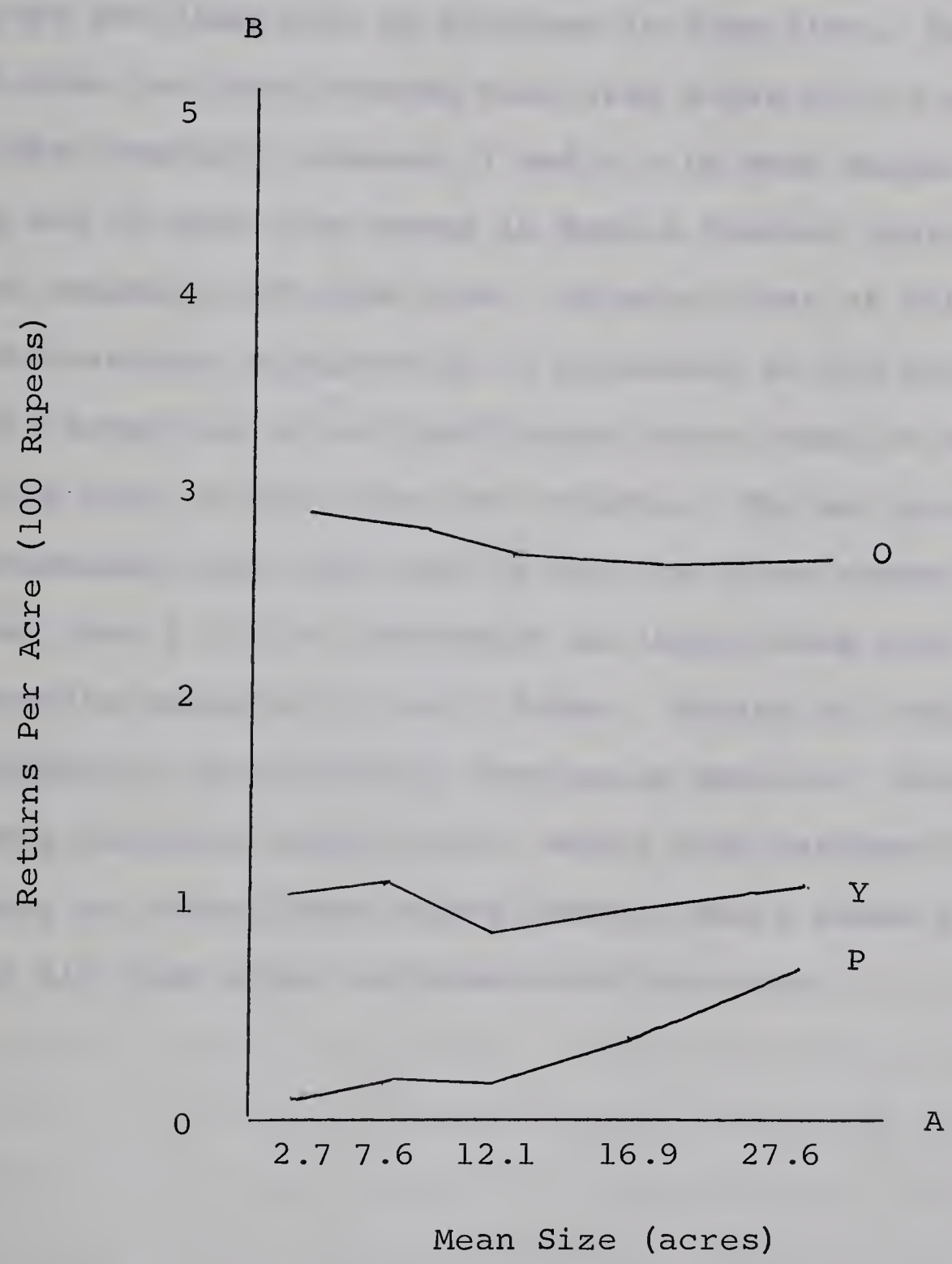

Figure 3

Returns Per Acre by Size of Farm (acreage)

Source: Ibid., Uttar Pradesh State, 1960

It was clear from the relationship that gross output per acre was declining as acreage expands It was this phenomenon of declining trend which led to the generalization that in Indian farming of the 1960's, gross output per acre declines with an increase in farm size. Farm business income per acre between mean size acres of 2.7 and 12.1, in Uttar Pradesh, between .7 and 4.4 in West Bengal, and between 2 and 17 mean size acres in Madhya Pradesh State declined with an expansion of farm size. To make clear of this phenomenon, the average relationship is presented in the form of figures. The behaviour of net profits per acre stood in sharp contrast with that of the other two returns. The net profits per acre increased with farm size in all the three states. The reason was that a little investment on large farms would give more profits compared to small farms. Taking all the three states together, the following conclusion emerged. Gross output per acre declined consistently, while farm business income per acre on large farms rather than on small farms and net profits in all farm sizes increased with farm size.

CHAPTER VI

SUMMARY AND CONCLUSION

India attempted to industrialize the economy rapidly without fulfilling the necessary prerequisites in the field of infrastructure. The allocation of outlays to agriculture and industry in the last fifteen years exemplifies the fact that Indian economic planning is based on an unbalanced growth theory. The government, in the third Plan, assigned a little importance to the production of one million tons of nitrogenous fertilizers which provided six pounds of nitrogen to each of the 350 million acres under crops. There had been no consideration given to the production of fertilizers (other than nitrogenous ones), improved plows and implements, the use of which could have stepped up agricultural production in the country. The data in the field of irrigation and credit policies in the last decade showed that the performance is not equal to the targeted levels. Both in the first and second Five Year Plans, provision of irrigation facilities had been inadequate to meet the needs of Indian agriculture. Important factors such as lack of coordination among the ministries and administrative inefficiency were found to be responsible for the ineffective implementation of irrigation plans. Regarding the role of credit, it was found loans were issued to rich farmers and denied to small holding farmers. It is concluded that low agricultural production was due to non-availability of

inputs from industry, inadequate provision of irrigation facilities and credit to farmers.

The analysis of Indian crop production showed that there was no relationship between the outlay allotted and output expected in the second Five Year Plan. It was also found that targets did not have a sound basis and were based on overambitious planning. The provision of inputs to agriculture showed that the government has failed to provide the targeted inputs by the end of each Five Year Plan. Individual crop production in the last ten years gave evidence that nearly half of the agricultural production was due to new area brought under cultivation. The examination of area under cultivation supported the hypothesis that no consideration was given to area planning in economic plans. The conclusion that emerged from this section was that the slow rate of growth of Indian agriculture was due to inadequate provision of and ineffective implementation of inputs. Attainment of self-sufficiency in grain production in future will be difficult unless due consideration is given to area planning.

A case study of the region in south India exemplified the fact that farmers were responsive to technological change. It was found that they were willing to accept improved methods of cultivation once they are induced and informed about the profitability and advantages. A majority of the small farmers were unable to apply adequate

fertilizers because of the fact that they did not have money to purchase them. Medium and large farmers would like to purchase, but fertilizers were not available in the region. The conclusion that emerged from this section supports the hypothesis that farmers were responsive to improved and scientific methods of cultivation.

The analysis of the data of the 1960's on agricultural productivity established an inverse relationship between the size of farms and gross output. The data showed that as the size of farms increased, gross output on a per acre basis declined and vice versa. The main reason for higher output on small farms was due to heavy application of family labour as well as intensive cultivation of the land. A unit of family labour under Indian traditions and culture, did more work or contributed more to gross output than a unit of hired labour. The average relationship presented in the form of figures between the size of farms and per acre returns confirmed the fact that as the size of farms increased, gross output declined and vice versa.

The major conclusion that emerged from this thesis supported the hypothesis that the slow rate of growth of Indian agriculture so far is due to inadequate provision of inputs and lack of balance between agriculture and industry, and administrative inefficiency in area planning. One could not expect self-sufficiency of agricultural production in the future on the basis of continuation of the existing plans.

APPENDIX I

Table 18

THE ALLOTMENT OF INPUTS IN RELATION TO THE TARGET OF AREA SERVED BY THEM

Item	Unit	Third plan	1961-62 actuals	1962-63 actuals	1963-64 actuals	Additional net rise in level	Col.7 as % of Col. 3
1	2	3	4	5	6	7	8
1. Irrigation	(Mil acres)						
a) major and medium	"	12.8	0.8	1.2	2.5	4.5	35.2
b) minor irrigation	"	12.8	1.8	2.1	3.0	6.9	53.9
2. Soil conservation	"	11.0	1.0	1.4	2.0	4.4	40.0
3. Dry farming	"	22.0	1.9	3.0	5.5	10.4	47.3
4. Improved seeds	"	203.0	67.0	81.0	15.0	46.0	31.1
5. Consumption of *chemical fertilizers	(thousand tons)	1000.0	280.0	350.0	450.0	250.0	31.3
a) phosphatic	"	400.0	72.0	80.0	160.0	90.0	27.3
b) Potassic	"	200.0	23.0	65.0	100.0	75.0	42.9
6. Organic green manure*							
a) rural compost	(mil tons)	150.0	75.0	83.0	109.0	43.0	51.2
b) urban compost	"	5.0	2.6	2.9	3.6	1.2	46.2
c) green manure	"	41.0	12.4	16.2	22.7	12.3	40.2
7. Plant *protection	"	50.0	16.0	17.0	22.0	6.0	17.0

Source: Planning Commission, Mid-term appraisal of the Third Five Year Plan, Government of India, 1963, p. 68.

* - Target level reached.

Table 19

CHANGES IN PRICE PARITY RATIOS AND ACREAGE UNDER SUGAR CANE
BIHAR PROVINCE

Year	Price parity ratio			(thousand acres)
1949-50	1 Wheat		0.073	Changes in acreage under sugar cane.
	2 Barley		0.130	
	3 Gram		0.120	410
	Changes in price parity ratios			
1950-51	Wheat	=	-0.011	
	Barley	=	-0.041	-74
	Gram	=	-0.034	
1951-52	Wheat	=	+0.018	
	Barley	=	+0.31	+23
	Gram	=	+0.024	
1952-53	Wheat	=	-0.011	
	Barley	=	-0.023	-60
	Gram	=	-0.026	
1953-54	Wheat	=	+0.014	
	Barley	=	+0.033	+27
	Gram	=	+0.026	
1954-55	Wheat	=	+0.017	
	Barley	=	+0.070	+52
	Gram	=	+0.050	
1955-56	Wheat	=	-0.060	
	Gram	=	-0.017	
	Barley	=	-0.040	+25
1956-57	Wheat	=	-0.017	
	Barley	=	-0.020	-27
	Gram	=	-0.023	
1957-58	Wheat	=	+0.012	
	Barley	=	+0.010	+29
	Gram	=	+0.023	

Source: Studies in Economics of Farm Management, Government of India, Bihar, 1959.

Table 20

COST AND RETURNS OF DIFFERENT CROPS

SI No.	Name of crops	Direct Charges: All	Direct Charges: Excluding imputed cost of family labour	Indirect Charges*	Total cost of cultivation including cost of family labour	Total cost of cultivation excluding cost of family labour	Total value of output**	Net returns (col.8-col.6)	Net returns including family labour
1	2	3	4	5	6	7	8	9	10
				Rupees per acre					
1	Pulses	42.00	17.00	34.68	76.68	51.68	106.00	29.32	54.32
2	Cotton	110.00	57.00	34.68	144.68	91.68	166.00	21.32	74.32
3	Sugar Cane	273.00	87.00	34.68	307.68	121.68	56.00	252.32	438.32
4	Paddy	149.00	97.00	69.36	218.36	166.36	251.00	32.64	84.64
5	Gram	116.00	85.00	69.35	185.35	154.35	224.00	38.65	69.65
	Total	690.00	343.00	242.75	932.75	585.75	1,307.00	374.25	721.25

The method adopted in calculating costs and returns are based on 1964 prices.

*Indirect costs includes common costs, including rents, Panchayat taxes, expenses of cattle shed and farm equipment.

**Total output includes output of grains of fodder plus yield.

Table 21

AVERAGE SIZE OF HOLDING IN RURAL AND URBAN AREAS BY INTEREST IN LAND

State	Rural				Urban			
	T	A	B	C	T	A	B	C
1	2	3	4	5	6	7	8	9
Jammu Kashnir	3.84	3.50	3.43	4.52	3.05	2.98	2.35	3.52
Panjab	13.78	13.71	9.78	15.47	15.46	16.78	9.67	17.39
Rajastan	16.01	16.02	10.60	18.82	13.18	13.13	11.35	16.64
Uttar Pradesh	5.27	5.38	2.77	5.03	8.47	8.83	3.49	7.74
Madhya Pradesh	10.60	10.59	6.26	12.39	13.14	13.61	7.72	14.67
Bihar	4.80	4.83	2.21	5.47	7.19	7.74	3.96	6.48
Orissa	5.19	5.21	3.05	5.72	6.85	7.28	3.65	6.05
West Bengal	4.10	4.07	3.13	4.83	4.62	4.67	3.51	5.45
Gujarat	12.53	12.55	8.06	14.30	13.12	15.65	4.41	5.21
Maharastra	12.87	12.68	6.78	17.08	16.37	16.08	6.35	14.60
Andhra Pradesh	8.04	7.80	4.71	10.71	8.99	9.18	11.49	23.28
Mysore	10.48	10.02	5.02	14.99	11.33	12.47	4.47	11.28
Kerala	1.83	1.43	1.96	3.28	2.26	2.33	6.01	12.96
Madras	4.58	4.69	2.77	5.46	5.53	4.89	1.91	3.39
Assam	4.75	4.93	2.89	5.53	4.56	5.65	2.51	5.81
All India	7.71 (7.39)*	7.78	4.28	9.07	9.97 (9.36)*	10.42 (9.63)*	5.35	11.72

Source: Government of India, 1961 Census Report

T = Total cultivating holdings, A = ownership holdings, B = Pure tenancy holdings
C = Mixed tenancy *Figures in brackets are based on total cultivated area, exclusion of area under pure tenancy.

Table 22

RETURNS AND COSTS BY SIZE OF FARM (ACRES) MADHYA PRADESH

	A Per farm returns and costs						B Per acre returns and costs				
Size group (acres)	Mean size holding	Gross out-put	Paid out cost	Farm business income (3-4)	Re-tained cost	Net profit (4+6)	Gross out-put	Paid out cost	Farm business income Col.(8-9)	Re-tained cost	Net profit Col.(8-9+11)
1	2	3	4	5	6	7	8	9	10	11	12
						in Rupees					
Below 5	2.95	299.5	133.0	166.5	117.5	49.0	105.0	46.5	58.5	41.5	17.0
5-10	7.35	642.0	314.5	327.5	256.5	71.0	89.0	42.5	46.0	37.5	8.5
10-15	12.45	1110.5	544.0	566.5	357.5	209.0	93.5	45.5	48.0	30.0	18.0
15-20	17.05	1365.0	650.5	714.5	523.5	191.0	81.5	39.0	42.5	29.0	13.5
20-30	24.25	1915.5	895.0	1020.5	574.5	446.5	84.0	39.0	45.0	25.0	20.0
30-40	34.65	2817.0	1256.5	1560.5	938.5	622.0	84.5	37.5	47.0	28.0	19.0
40-50	44.25	3997.5	1892.5	2105.0	1050.0	1055.0	97.0	46.0	51.0	26.5	24.5
50 and above	85.40	7352.0	3680.0	3672.0	1913.0	1759.0	91.5	46.0	45.5	24.0	21.5

Table 23

Westbengal State

	A						B				
Below 1.25	0.66	153.1	69.7	83.4	77.5	5.9	213.1	86.7	126.4	117.3	9.1
1.26-2.50	1.81	436.8	205.4	231.4	170.1	61.3	240.9	113.1	127.8	101.6	26.2
2.51-3.75	3.10	720.6	364.1	356.5	263.4	93.1	233.4	118.6	115.0	85.0	30.0
3.76-5.00	4.35	877.7	398.8	478.9	431.9	47.8	202.5	93.7	108.8	85.2	23.6
5.01-7.50	6.23	1479.8	738.7	741.1	469.2	271.9	246.9	128.0	118.9	68.0	50.9
7.51-10	8.36	1869.1	793.9	1075.2	619.7	455.5	220.5	91.8	128.6	73.6	55.0
10-15	12.13	2121.1	1192.7	928.4	505.4	423.0	172.7	96.2	76.5	41.1	35.4
Above 15	23.23	4389.4	1924.2	2465.2	1812.9	652.3	189.0	82.9	106.1	73.1	33.0

Source: Directorate of Economics and Statistics, Studies in Economics of Farm Management, Westbengal and Madhya Pradesh, Government of India, 1960.

Table 24

UTHAR PRADESH (CENTRAL INDIA)

	Part A						Part B				
	Per farm returns and costs						Per acre returns and costs				
Size Group (acres)	Mean size holding	Gross out-put	Paid out cost	Farm business income Col.(3-4)	Re-tained cost	Net profit Col.3-4+6	Gross out-put	Paid out cost	Farm business income Col.(8-9)	Re-tained cost	Net profit Col.8-(9+11)
1	2	3	4	5	6	7	8	9	10	11	12
						in Rupees					
Below 5	2.75	962.0	626.7	335.3	346.6	11.3	292.0	190.3	101.7	105.0	3.3
5 - 10	7.6	2025.3	1176.3	849.0	548.3	300.7	266.3	154.3	112.0	73.0	39.0
10 - 15	12.1	2632.0	1602.7	1029.3	585.3	444.0	227.0	141.0	86.3	49.0	37.3
15 - 20	16.9	3839.7	2152.6	1687.3	795.6	891.7	228.0	127.7	100.3	47.3	53.0
20 - above	27.6	6440.0	3197.7	3243.0	932.7	2310.3	234.3	116.3	118.0	34.0	84.0

Source: Directorate of Economics and Statistics, Studies in Economics of Farm Management, Uthar Pradesh State, Government of India, 1960.

APPENDIX II

AGRICULTURE IN ECONOMIC DEVELOPMENT

The process of economic development and historical experiences of a few countries

Broadly, three approaches to the problem of agriculture and its role in economic development can be discerned in the literature. One group of writers like Albert O. Hirschman, and Singer, following Karl Marx, argue that economic development can be achieved through the establishment of industries without necessarily stressing revolution in the field of agriculture at the early stages.[1] They have stated that a developing country has only limited resources to give to investment and growth. Under these conditions it simply cannot do everything at once. So it has to invest in the industrial sector that gives immediate and profitable returns. They argue that the theory that an underdeveloped country should develop its agricultural sector, then export primary products in exchange for industrial products, is a spurious one for there is a long-run trend for the prices of agricultural products to fall relative to the prices of industrial goods. In other words, the prices an under-developed country would have to pay for industrial products would be constantly increasing, whereas the prices of the agricultural products would be comparatively less, thus putting the underdeveloped country at a disadvantage.

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[1]Albert O. Hirschman, The Strategy of Economic Development (New Haven: Yale University Press, 1964). B. Higgins, Economic Development (New York, W. W. Norton & Company), p. 389. M. M. Bobbler, Karl Marx's Interpretation of History (Cambridge, Mass.: Harvard University Press, 1950).

A few countries like the Soviet Union, Communist China, Argentina, Yugoslavia, Poland and West Germany have failed to bring about economic development by embarking on massive industrialization efforts at the initial stages of their economic planning. When we look at the historical experience of these countries in the process of their economic development, they have all been confronted with difficulties midway in the implementation of their plans. Communist China inaugurated a planned approach to economic development in 1953, giving high priority to the location of heavy industries at the initial stages. It had underestimated the importance of transforming the agricultural sector. The result was that in the middle of the first Five Year Plan all industries were closed because the necessary inputs from agriculture were not available. The Chinese Government modified the plan and has since given high priority to the agricultural sector. Similarly, Argentina has not succeeded in her attempts to industrialize the economy suddenly and has even found it necessary to import wheat from the United States. Historical experience of Eastern Europe in 1956 showed that heavy industry was lavishly planned and then the units were found to be without adequate raw materials and hence produced little of economic value. Half finished steel mills were symbols of planning that had miscalculated in the most expensive way.[1]

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[1] Barbara Ward, The Rich Nations and the Poor Nations, (New York: W. W. Norton Company, 1960), p. 103.

Yugoslavia and Poland also experienced similar difficulties for lack of the necessary inputs from agriculture. Despite the neglect of the individual initiative of farmers, the Soviet Union has registered some progress.

Some scholars like W. F. Owen, Ragnar Nurske, W. Arthur Lewis, and T. A. Scitovsky suggested a balanced growth for quick economic development by giving equal importance to both the farm and non-farm sectors.[1] The chief aim of balanced growth is that both agriculture and industry be developed with increasing intensity, with industry supplying the basic needs in the form of inputs for agriculture and agriculture supplying back its surpluses at low prices for the expansion of industry.

The balanced growth approach has been successfully implemented by the United States as a goal of its economic policy and has registered significant improvement in per capita income for every sector of the economy. Based on the experience of the United States, Nurkse and others point out that a developing country must achieve advances simultaneously over a broad range of activities. Further, they point out that the overall transformation of a society in social, cultural, and economic spheres, can be sought

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[1]W.F. Owen, "Double Developmental Squeeze in Agriculture," American Economic Review (March 1966); Ragnar Nurske, Problems of Capital Formation in Underdeveloped Countries (Oxford: University Press of Oxford, 1958), p. 25. W. Arthur Lewis, The Theory of Economic Growth (London: George Allen, Unwin Ltd., 1961); T.A. Scitovsky, Welfare Economics (New York: W.W. Norton & Company, Inc., 1961).

through proper development of infrastructure at the early stages. Infrastructural development means the provision of good roads, communication facilities, railways, education, etc., in the economy.

Many of the developing nations in the modern era who have implemented and are implementing planned economic development have ignored the importance of infrastructure in the process of economic development. The neglect of this important infrastructure at the early stages of development is one of the main reasons for the slow rate of growth of these countries. Hence, "any planned process of development, if it is to succeed, must maintain a dynamic balance between agriculture and industry".[1]

The Fisher and Clark growth stage thesis suggested that economic development of a country should be judged by looking into the proportion of people moving from agriculture to secondary and tertiary occupations. It has been established that the percentage of workers engaged in the tertiary sector will increase through economic development.[2] The economic progress of the United States in the last five decades may be seen in Table 25.

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[1] W. Arthur Lewis, op. cit., p. 330.

[2] Sorenson, Agricultural Market Analysis, (M.S.U. Business Studies, 1964), p. 37.

Table 25

PERCENTAGE DISTRIBUTION OF EMPLOYMENT BY MAJOR GROUPS IN THE UNITED STATES, SELECTED YEARS, 1919 - 1959

Year	Primary (Agricultural, and mining)	Secondary (Contract, construction, and mfg.)	Tertiary (Transport, trade, finance, services)
1919	28.5	29.4	42.1
1920	28.9	28.6	42.5
1923	27.6	28.2	44.2
1925	26.8	27.7	45.5
1928	25.4	27.5	47.1
1930	25.8	26.6	47.6
1933	30.1	22.7	47.2
1935	26.6	25.5	47.9
1938	24.5	25.5	50.0
1943	18.3	36.0	45.7
1945	17.8	32.4	49.8
1948	15.5	32.1	52.4
1950	14.8	32.5	52.7
1953	11.9	34.0	54.1
1955	12.0	32.9	55.1
1958	10.5	31.1	58.4
1959	10.3	31.5	58.2
	%	%	%

Source: J.P. Henderson, "Changes in the Industrial Distribution of Employment", 1919-1959, University of Illinois, Bulletin 81.

The third group of scholars like T. W. Schultz, Ranis-Fei, W. W. Rostow, Simon Kuznets and J. K. Galbraith argue that transformation of agriculture is a pre-condition for the expansion of the industrial sector as well as for the overall development of the economy.[1] According to these writers, if agricultural productivity is increasing fast enough, the savings of the farmers may become available to finance investment in the other sectors of the economy. It is one of the basic principles of economic theory that if agricultural output fails to grow at an adequate rate, prices of food and agricultural raw materials will rise, leading to an increase in wages and general inflation.

Historical experiences show that the industrial take-off in England and Western Europe between 1750 and 1850 was really made possible by the agricultural surpluses of the countries concerned, preceding this period. The industrial development of Japan in this century has been largely due to the agricultural surpluses that were generated in her economy during the last two decades of the 19th and the first two decades of the 20th century. Simon Kuznets' conclusions are quite explicit on this point:

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[1]T. W. Schultz, Transforming Traditional Agriculture (New Haven: Yale University Press, 1960); Ranis-Fei, The Problems of Labor Surplus Economy, Economic Growth Centre (New Haven: Yale University Press, 1964); W. W. Rostow, Stages of Economic Growth (Cambridge, 1960); Simon Kuznets, Lectures on Economic Growth (Illinois: John Hopkins University Press, 1961); J. K. Galbraith, Economic Development in Perspective (Cambridge, Mass.: Harvard University Press, 1963).

> It is a pre-condition of industrialization as a world wide phenomenon that productivity of labor increases sufficiently to feed, at higher per capita levels, a larger proportion of the labor force than could be fed before. And as our estimates have shown, in most of the developed countries, product per worker in agricultural sector increased more than the product per worker in the rest of the economy combined. At the danger of stressing the obvious, one may claim that an agricultural revolution--a marked rise in productivity per worker in agriculture is a pre-condition of the industrial revolution for any sizeable region in the world.[1]

W. W. Rostow also observes that "a good part of the working capital for modernized industry must come from rapid increases in output achieved by higher productivity in agriculture".[2]

Thus there has been a great deal of controversy among modern economists concerning the kind of approach to be adopted for economic development of the underdeveloped nations. So far no unanimous agreement has been reached. It is not the purpose here to go to any length into details of pros and cons of various developmental approaches except in order to show that agricultural revolution is very important in the economic growth of underdeveloped countries, whether it precedes or goes along with industrial development. The strategy to be adopted, of course, will depend upon the existing stage of the economy of the country concerned.

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[1] Simon Kuznets, op. cit., p. 63.

[2] W. W. Rostow, op. cit., p. 83.

Factors impeding agricultural progress in India

The unsatisfactory performance of Indian agriculture, with special reference to food grain production in the last decade, has been subjected to criticism from various sources. The important viewpoints are as follows:

C. D. Deshmuk referred to the fact that the Government of India has failed to reach the food grain targets by the end of the second Five Year Plan (1955-56).[1] A team of American economists who visited India in 1961 expressed dissatisfaction over the failure of the government to reach food grain targets. They have attributed the failure to the inability of administration of the Government of India. Quite a few attribute the failure to inability and the absence of coordinated thinking at the Federal level and the absence of comprehensive estimation of overall needs of the programmes. It also perhaps indicates a grave lack of coordination between the activities and thinking of related ministeries such as the Ministry of Agriculture, Ministry of Commerce and Industry, and the Ministry of Finance.[2] Dr. Vakil attributed the causes for low food grain production to the absence of appropriate price policy. He wrote: "It has been agreed since the beginning of planning

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[1] C. D. Deshmuk, Economic Development in India (New Delhi: Asia Publishing House, 1962), p. 20

[2] K. N. Raj, Agricultural Prospects in India (Madras: Chaitanya Publications, 1960), p. 210.

in India, that an appropriate price policy on the part of the government is required for the implementation of a plan for agriculture. However, this price policy is entirely absent."[1] If the rate of production of agriculture is very low, or if sufficient incentives are not available to the agricultural producers to bring their surpluses to market (as for example happened in Russia due to scarcity of manufactured goods which the cultivators buy in return) or if they consume a large part of the additional produce, a food shortage is likely to arise. The agricultural administration committee has stated that "agricultural departments have no effective say in framing policies."[2] It has stated that although regions are peculiarly different from each other in the field of food grain production, the pattern of work and allocation of funds are uniform.[3] John P. Lewis has stated that lack of capital supply is not a principal impediment to rapid agricultural progress. The foreign exchange difficulties and shortage of fertilizers are obstacles for rapid expansion of agricultural production in India.[4]

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[1] K. Vakil, Indian Economic Policy (Calcutta: World Press, 1962), p. 25.

[2] Ministry of Food and Agriculture, Report of the Agricultural Administration Committee, Government of India, 1961, p. 10.

[3] Ibid., p. 20.

[4] John P. Lewis, "Prospects for Indian Economic Development," Economic Weekly, (Jan. 1951), p. 56.

Mrs. Kusum Nair argued that low food grain production is due to custom, religion, ignorance and the fatalistic philosophy of Hindu farmers.[1] She has stated: "it may sometimes be easier to build a million ton steel plant in India with borrowed money and hired know-how, if necessary, than to change a man's outlook on such matters as the use of irrigation water, improved seed, and scientific methods of cultivation."[2] The World Bank Commission also reported that agricultural productivity in India is retarded mainly due to "poverty and ignorance of Indian agriculturists."[3] T. W. Schultz argued that differences in the rate of growth of agricultural production depends upon the differences in the level of the acquired capabilities of farm people. He pointed out that the slow rate of growth of agriculture in underdeveloped countries, compared to developed countries, is not because of differences in climate, material inputs and soil conditions but because of the differences of the capabilities of the human agent.[4] Some writers like W. Arthur Lewis, Ragnar Nurkse, and Nasir Ahmad Khan argue that farmers in underdeveloped countries have traditional beliefs and attitudes to work and are

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[1] Kusam Nair, Blossoms in the Dust (London: Gerald Duckworth Co. Ltd., 1961).

[2] Ibid., p. 4.

[3] International Bank for Reconstruction and Development, Report of the World Bank Commission (Washington: 1956).

[4] T. W. Schultz, op. cit., p. 30.

non-responsive to improved methods of cultivation.[1] Moreover, they have stated that 25 percent of the farmers in underdeveloped countries are working at zero marginal productivity. This means that with unchanged techniques of production and without any significant reorganization of agriculture, the agricultural families remain engaged in their family holdings, though their contribution to the total production is zero. The removal of a sufficient number of labour force from small holdings may not affect the total output. P. T. Bauer pointed out that the desire for material betterment, a willingness to work hard and in a regular punctual manner, an awareness of the future benefits of present sacrifices, and that these attitudes may be largely absent in underdeveloped countries as the prerequisites of economic growth.[2]

Eckaus and Ranis-Fei argued that low agricultural production in India is due to small and uneconomic holdings scattered over a large area. The low per capita productivity is mainly due to low average size of holdings.[3]

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[1] W. Arthur Lewis, op. cit., p. 62; R. Nurske, op.cit., p. 109; N. A. Khan, The Problems of an Underdeveloped Economy (New Delhi: Asia Publishing House, 1964), p. 110.

[2] P. T. Bauer, West Africa Trade (Cambridge University Press, Cambridge, 1954), pp. 2-3.

[3] R. S. Eckaus, "Factor Proportions in Underdeveloped Countries," American Economic Review (Sept. 1955); Ranis-Fei, The Problems of Labor Surplus Economy, Economic Growth Centre (New Haven: Yale University Press, 1964).

Because of continued division and fragmentation of holdings due to defective land tenure, laws of inheritance and pressure of population, farms have been reduced to a size much below the minimum. Writers like Eckaus and Ranis-Fei have argued that in a majority of the underdeveloped countries, marginal productivity is zero.

Ranis-Fei pointed out that economic development of the developing nations lies in removing the surplus farm labour and employing it for the development of the industrial sector. Eckaus and Ranis-Fei have divided the underdeveloped economy into three phases: first phase in which marginal cost is more than marginal physical product; second phase in which marginal cost equals MPP; and the third phase in which marginal cost is less than marginal physical product. According to their assumptions, the removal of labour from phase one will not affect the total output. The same would happen if labour were removed from phase two. Based on this analysis, they have argued that a majority of the developing nations in the world are faced with disguised unemployment. However disguised unemployment is found on the small farms that have high inputs of labour per acre and depend more heavily on family labour. Another common argument in connection with disguised unemployment is that "the typical Indian holding is so small that there is not sufficient land to employ family workers productively and

hence hidden (disguised) unemployment is the result."[1]

T. W. Schultz used historical data on India to support the view that the marginal productivity of labour is not zero, but this is based on evidence of some forty years ago when India had a population of about 180 million less than at present and is not directly relevant to the present controversy.[2]

The arguments of Ranis-Fei and Eckaus are controversial among modern economists. Is it true that additional labour inputs add nothing to total output? However, it should be judged on the basis of input and output farm data of a particular region or nation. Leibenstein argued that farmers might get more product if they were given more land but that they also get additional product cultivating their existing plots of land more intensively.[3] Paul Wonnacott argued that an individual farmer in developing countries producing at zero marginal productivity employs hired labour because he is persuaded by social and political pressures to hire his share of the labour force whether he wants to hire this labour or not.[4] John W. Meller in a field study of a

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[1] R. S. Eckaus, op. cit., p. 220.

[2] T. W. Schultz, op. cit., p. 213.

[3] H. Leibenstein, "Economic Development in Underdeveloped Countries," Asian Economic Review (Jan. 1960).

[4] Paul Wonnacott, "Disguised and Overt Unemployment in Underdeveloped Countries," Quarterly Journal of Economics, (May 1962), p. 20.

village in North India found that differences in yields are due to differences in the use of labour inputs.[1]

The Agro-Economic Research Centre of the University of Madras in a recent survey report stated that the supply of hired labour in some of the sample villages is gradually becoming acute to meet the increased demands of intensive agriculture. The acute shortage of labour brings into use some amount of female labour.[2] Leibenstein has stated that it is possible to improve the standard of living of the labour force in underdeveloped countries by providing higher wages and improved diet. A small proportion of farm labour could, then, perform the same work as was done by the larger non-energetic labour force. The workers who could then be dispensed with, without affecting the output, are called surplus labour.[3] The argument of Leibenstein is not correct in Indian farming. A few studies show that farmers may not work hard if they are given good food to eat. W. Arthur Lewis remarked that a quarter of the rural people in India are surplus and their removal from the land would make no difference to agricultural output.[4]

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[1] John W. Meller, "Increasing Production in Indian Agriculture," AICC Economic Review (April 1960), p. 10.

[2] Agro-Economic Research Centre, Report of the Labor Enquiry in Sample Villages of Madras State (University of Madras, 1955), p. 20.

[3] H. Leibenstein, Economic Backwardness and Economic Growth (New York: MacMillan Company, Ltd., 1957), p. 10.

[4] W. Arthur Lewis, Economic Development with Unlimited Labor (Manchester School of Economics and Social Studies, Manchester, 1954), p. 139.

The results of investigations made by the Provincial Banking Enquiry Committee in 1929 and the Panjab Board of Economic Enquiry showed that 60 to 70 percent of the holdings in India were uneconomic.[1] The Land Revenue Commission, Bengal, has estimated that 41.9 percent of the family holdings were below 2 acres and 20.6 percent of the holdings were between 2 and 4 acres.[2] The Famine Enquiry Commission in 1944 defined a minimum holding as one which is capable of yielding in terms of cereals not less than two tons and not more than 5 tons, and found on this basis that two-thirds of the total number of holdings in Bengal and the Panjab, over one-half in Uttar Pradesh and Bombay, and three-fourths in Madras, were uneconomic.[3] According to the Agrarian Distress Committee, a majority of the holdings in Uttar Pradesh varied between 2.5 and 4.0 acres in 1931. The average size of a holding in Uttar Pradesh (Central India), according to the data collected by the Zamindari Abolition Committee, ranged between 2.98 and 3.36 acres, 37.8 percent of the cultivators had holdings below one acre; 65 percent of cultivation holdings in Hyderabad were below two acres, as against 49 percent in Uttar Pradesh and 51 percent in Madras.[4]

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[1] Dr. Calvert, Size of Holdings, Board of Economic Enquiry (Panjab, 1930), p. 220.

[2] Bengal, Report of the Land Reforms Committee, Vol. I (1960).

[3] Indian Famine Commission, Land Tenures in India, 1942, pp. 14-19.

[4] Report of the Agrarian Reforms Committee, New Delhi, 1942, p. 91.

From the above data, it is clear that a large number of the families in the 1940's did not have economic holdings. Based on the data of 1940, a few persons have established an interrelationship between the size of holding and gross output. N. A. Khan has stated that as the size of holding increases, gross output and net returns increase, and as the size of holding declines, gross output and net returns decrease.[1] The result of having small farms in India is that farmers are compelled to employ too much labour relative to the amount of capital and land, and returns per unit of labour have declined.[2]

Role of the state in agricultural development

Agricultural production should be increased in developing countries only through the government's assistance in the form of provision of irrigation, fertilizers, seeds, pesticides, and credit to vast millions of peasants. One important thing which must be remembered is that direct intervention of the government will impair the individual initiative of the farmers and thereby agricultural production itself. The Soviet Union and Communist China have already experienced the adverse consequences of direct intervention and neglect of the individual farmer's initiative in agriculture.

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[1]Nasir A. Khan, op. cit., p. 240.

[2]Mrs. Thacker, "Size of Holdings in India," Agricultural Situation (Jan. 1940), p. 20.

J. K. Galbraith has suggested that:

> . . . in the early stages of development, it undoubtedly involves the building of organs of public administration and the provision of an educated minority, a nucleus of people who can build the system of public administration that enables the masses of the people to participate in economic activity.[1]

It is therefore imperative that in order to develop, the economy has to provide the means and incentives to transform the agricultural sector. Whether it is a question of zamindars in India, the tribal leaders of Africa, or the feudal landlords in Latin America, they are not as a group in a mood to transform their lands and their techniques. The peasants have no incentive to change since any gain could be confiscated by the landlords in the form of higher rent. Any government which is interested in the economic well-being of the poor masses has to safeguard, in particular, the interest of small cultivators who constitute the bulk of farm population in underdeveloped countries. It is the duty of the government to ensure the basis of progressive agriculture and social justice in the rural community as well as to release the energies and enlist the enthusiasm of all strata of the population for the success of planned development.[2]

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[1] J. K. Galbraith, op. cit., p. 13.

[2] K. Srinivoson, Economic Development and Policies (New Delhi: Allied Publishers Private Limited, 1963), p. 110.

One of the important objectives of a planning authority in agriculture should be that of land reform and agricultural reorganization. The main aim of land reform is the abolition of intermediaries, protection of tenant rights, imposition of ceilings, and cooperative farming. The efficiency of the government in the field of agriculture ought to be judged between the legislative provisions and their implementation.[1] In a developing economy where capital is scarce, emphasis has to be placed on better tools, improved methods and techniques, and on stimulus to resourcefulness in invention or adoption of devices which contribute to the quality and effectiveness of existing capital in the economy. The chief instrument in changing the outlook of the farmers, however, is providing efficient marketing facilities. All these means have to be undertaken by the government. The countries where, for one reason or another, the state failed to play its proper role did remain backward economically all through the nineteenth century and are still in the same condition.

There is unanimous agreement among modern economists regarding the role of the state and planning in the process of development of underdeveloped countries.[2] As pointed out by Gunnar Myrdal, the strategy of planning should be decided not by ideological considerations but by the hard realities

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[1] Ibid., p. 250.

[2] United Nations, Measures for the Economic Development of Underdeveloped Countries (New York: 1951), p. 98.

of the situation in the countries.[1] In this connection, it may be interesting to note the unanimity with which central economic planning as a policy for underdeveloped economics was advocated by the U. N. O. experts.[2]

> "It has been a minor irony of the post war experience of the United States," Prof. W. W. Rostow observes, "that its agents both in Europe and in underdeveloped countries have found themselves urging an increased role for government planning in the economies of the areas where American interest was engaged. This was the consequence of no conspiracy among new dealers or socialists who found their way into American foreign operations. This was a realistic response to the nature of the societies where a sustained rate of economic development was sought in the American interest."[3]

There is a strong view held by economists that most of the developing nations failed to generate a process of self-sustained growth mainly due to either weak governments or inadequacies of state policies. In view of their relative economic backwardness at present, the underdeveloped countries can complete their "take-off" stage only by a state initiated planned process of development.[4]

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[1]Myrdal Gunnar, An International Economy (London: W. W. Norton Company, 1955).

[2]U. N. O., Measures for Economic Development of Underdeveloped Countries (New York: 1951).

[3]W. W. Rostow, The Process of Economic Growth (Oxford: Oxford University Press, 1953), p. 257.

[4]International Bank for Reconstruction and Development, Eighth Annual Report - 1952-53 (Washington, U.S.A.), p. 92.

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